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SUBJECT: Responds to request for addl info re 10CFR50.62 (ATWS Rule).

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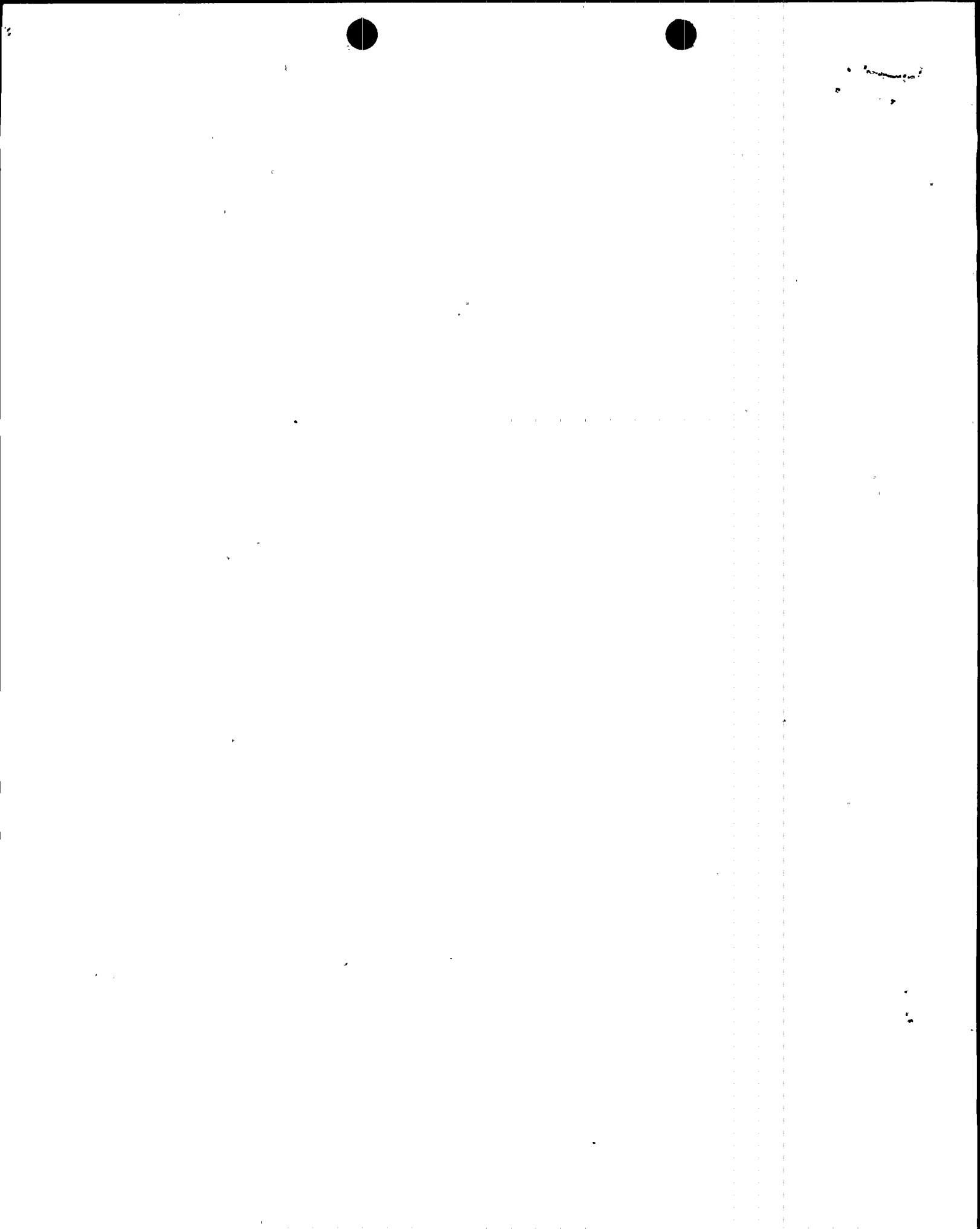
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WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

161-02405-WFC/ACR/KLMC
September 29, 1989

Docket Nos. STN 50-528/529/530

Document Control Desk
U. S. Nuclear Regulatory Commission
Mail Station PL-37
Washington, D. C. 20555

- References: 1) Letter from T. L. Chan, NRC, to D. B. Karner, APS, dated April 5, 1989. Subject: Request for Additional Information - 10 CFR 50.62 (ATWS Rule)
- 2) Letter to the NRC from D. B. Karner, APS, dated April 27, 1989. Subject: Schedule for Response to Request for Additional Information - 10 CFR 50.62 (ATWS Rule)

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station
Units 1, 2 and 3
Response to Request for Additional Information -
10 CFR 50.62 (ATWS Rule)
File: 89-056-026

As requested by Reference 1), Arizona Public Service Company (APS) is providing a response to the request for additional information. APS's response to Item 2 of Reference 1) is provided in the attachment to this letter.

If you should have any questions concerning this matter please contact Mr. A. C. Rogers of my staff, at (602) 371-4041.

Sincerely,



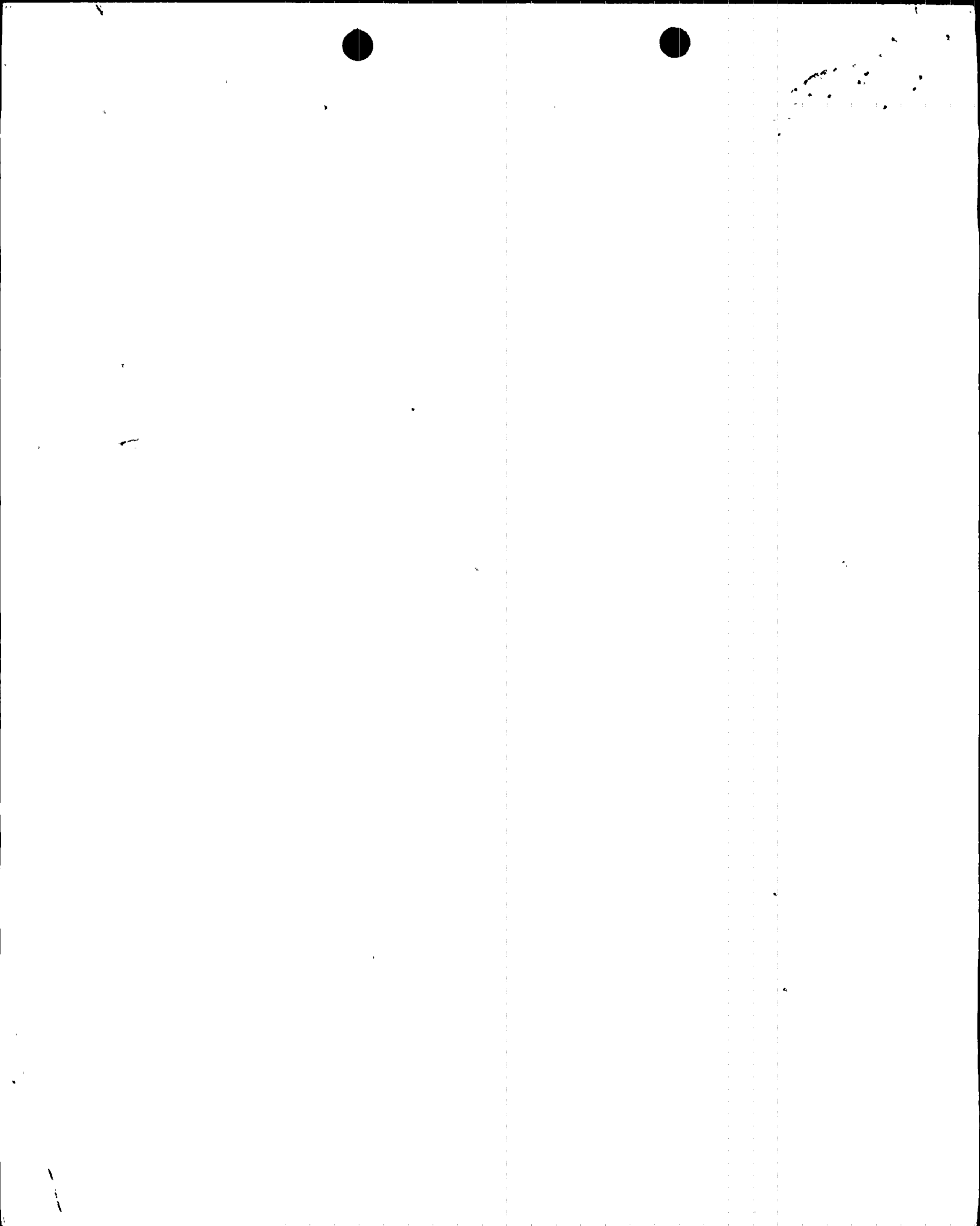
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Attachment

cc: J. B. Martin (all with Attachment)
T. L. Chan
M. J. Davis
T. J. Polich

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ATTACHMENT

APS Response to Request for Additional
Information - DSS Modification

NRC Position Based on the staff's review of CE letters dated February 27, and September 18, 1987, the following list of questions was generated. Please provide the response to these questions.

Item (2) (a) Provide detail and show on a block diagram the selective logic network that opens the MG Set output load contactors.

APS Response

Diagram A (attached) reflects the Diverse Scram System (DSS) modification and the selective logic that will open the Motor-Generator (M-G) Set output load contactors.

Item (2) (b) On the selective logic network block diagram indicate the control grade portion of the circuits and show the location of the isolators.

APS Response

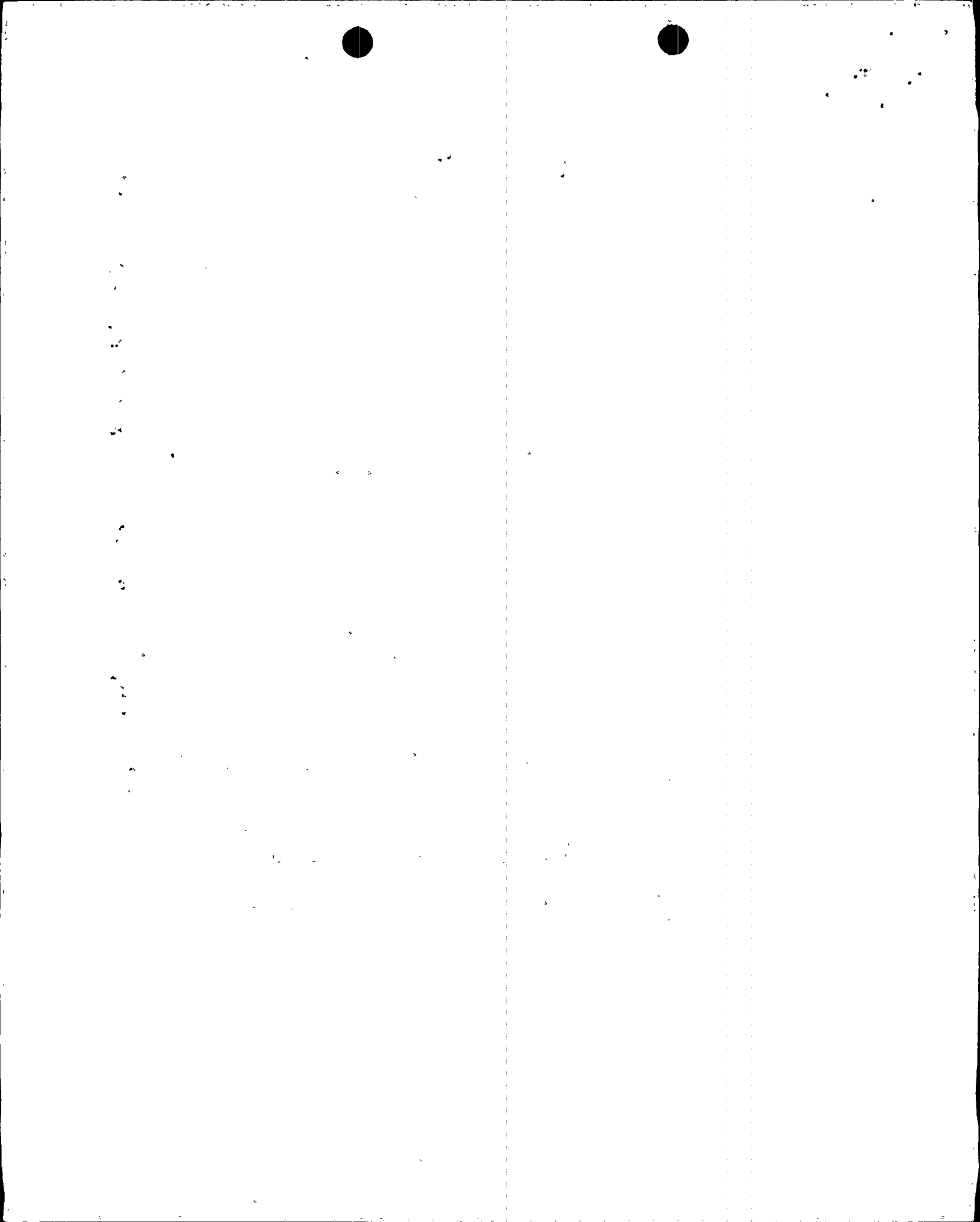
The control grade portion of the ATWS DSS modification is depicted on Diagram A (attached).

Item (2) (c) Expand Figures 1 and 2 in CEN-362 to show the power supplies and their source of power.

APS Response

Figure 1 (attached) has been modified to contain the requested information on the power supplies and sources.

Item (2) (d) Contrary to the statement in CEN-362, the diverse reactor trip and diverse turbine trip have not been resolved. Provide the details showing how these two trip systems are in conformance with the ATWS Rule implementation guidance.



APS Response

The existing PVNGS design, as described in the UFSAR, incorporates several safety grade systems designed to protect the plant and mitigate the consequences of the ATWS event in addition to various design basis events. These include the following features:

Reactor Protective System (RPS) - Initiates a reactor trip to protect the RCS pressure boundary in the event of high pressurizer pressure or low steam generator level (conditions indicative of an ATWS). The system consists of sensors, bistables, bistable relays, matrix relays, initiation relays, and actuation devices.

Core Protection Calculators (CPCs) - Provide inputs to the Reactor Protective System (RPS) by actuating the appropriate RPS bistable relays when cold leg temperature or pressurizer pressure exceed the allowable range (conditions indicative of an ATWS).

Engineered Safety Features Actuation System (ESFAS) - Generates an Auxiliary Feedwater Actuation Signal (AFAS), in the event of low steam generator level. The system utilizes the outputs from RPS sensors to actuate the AFAS specific bistables, bistable relays, matrix relays, initiation relays, and actuation devices.

Supplementary Protection System (SPS) - This diverse reactor trip system augments the RPS by utilizing an independent and diverse trip logic (relative to the RPS) for initiation of a reactor trip. The SPS provides a simple, reliable, and diverse mechanism to increase the reliability of a reactor trip when the pressurizer pressure exceeds a predetermined value. The existing SPS is a four channel safety grade system which is independent and diverse from the CPCs, RPS (up to the final actuation device), and the AFAS. The final actuation devices for the SPS safety grade reactor trip are the reactor trip breakers which are also actuated by an RPS trip signal.

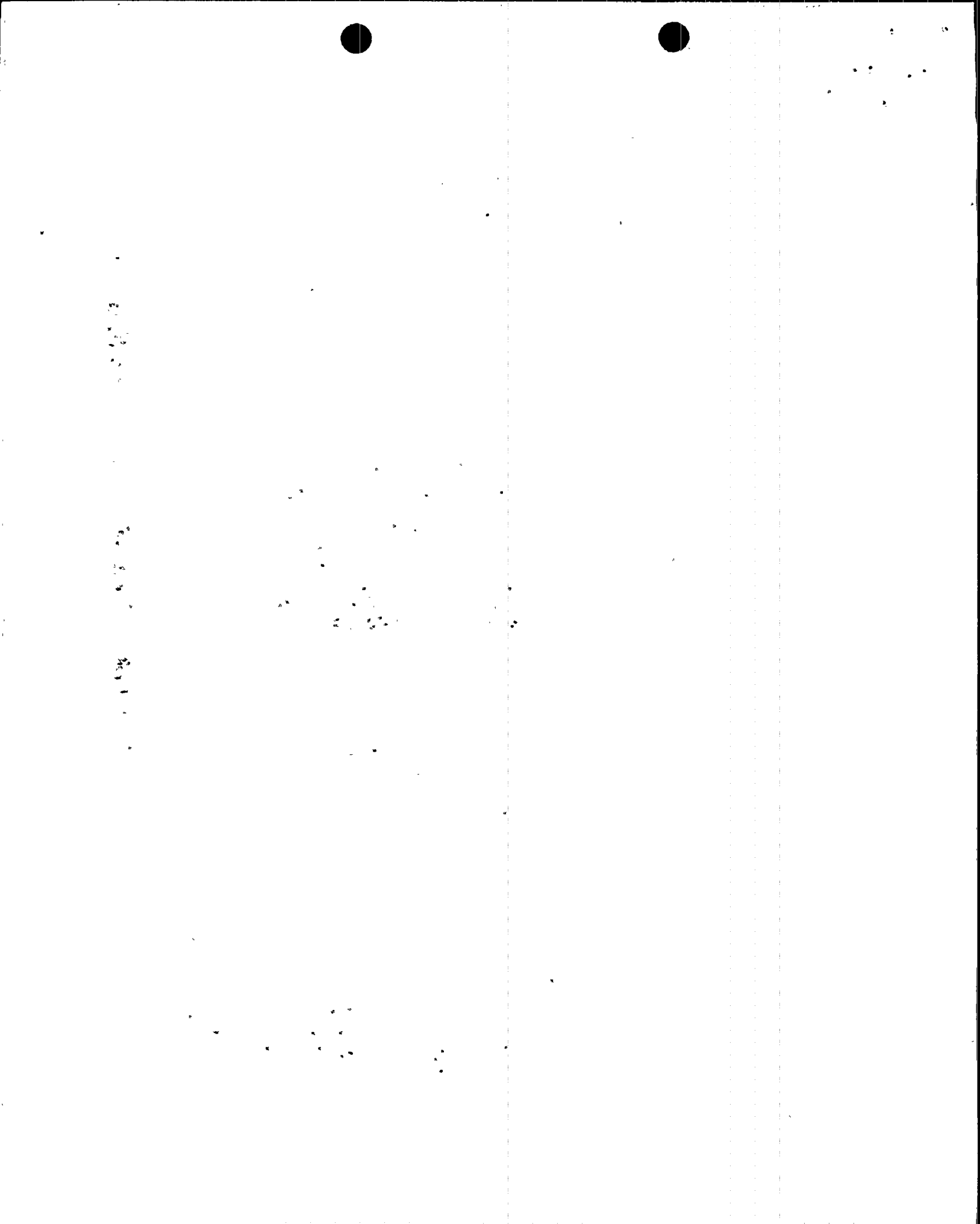
To provide full compliance with the ATWS rule, APS will modify, by the DSS modification, the existing SPS to reflect the addition of control grade circuitry to allow the SPS to trip the CEDM M-G Set output load contactors. This trip, with appropriate isolation, will be diverse and independent from the RPS actuation of the reactor trip breakers. The isolation devices will maintain the current reliability of the SPS as a safety grade system.

The SPS, with the DSS Modification, provides a turbine trip initiation that is diverse and independent from the reactor trip system. The SPS causes a reactor trip by interrupting power to the Control Element Assembly common power bus. Upon interruption of this power, undervoltage relays attached to the bus de-energize, causing actuation of the turbine trip circuitry. The turbine trip is initiated from both the existing RPS and through the diverse modified SPS.

Item (2) (e) Provide the isolator qualification data requested by Attachment 1.

APS Response

This information, as requested, is provided in Attachment 1.



Attachment 1

Isolation Device Request for Additional Information

NRC Position

Each light-water-cooled nuclear reactor shall be provided with a system for the prevention and/or mitigation of the effects from Anticipated Transient Without Scram (ATWS) events. The Commission-approved requirements for the prevention/mitigation of ATWS events are defined in the Code of Federal Regulations (CFR) Section 10 paragraph 50.62. The staff has determined that the isolation devices used within ATWS prevention/mitigation systems (to provide isolation between class 1E and non-class 1E circuits or between redundant class 1E circuits) will be reviewed on a plant-specific basis. The following additional information is required to continue and complete the plant-specific isolator review:

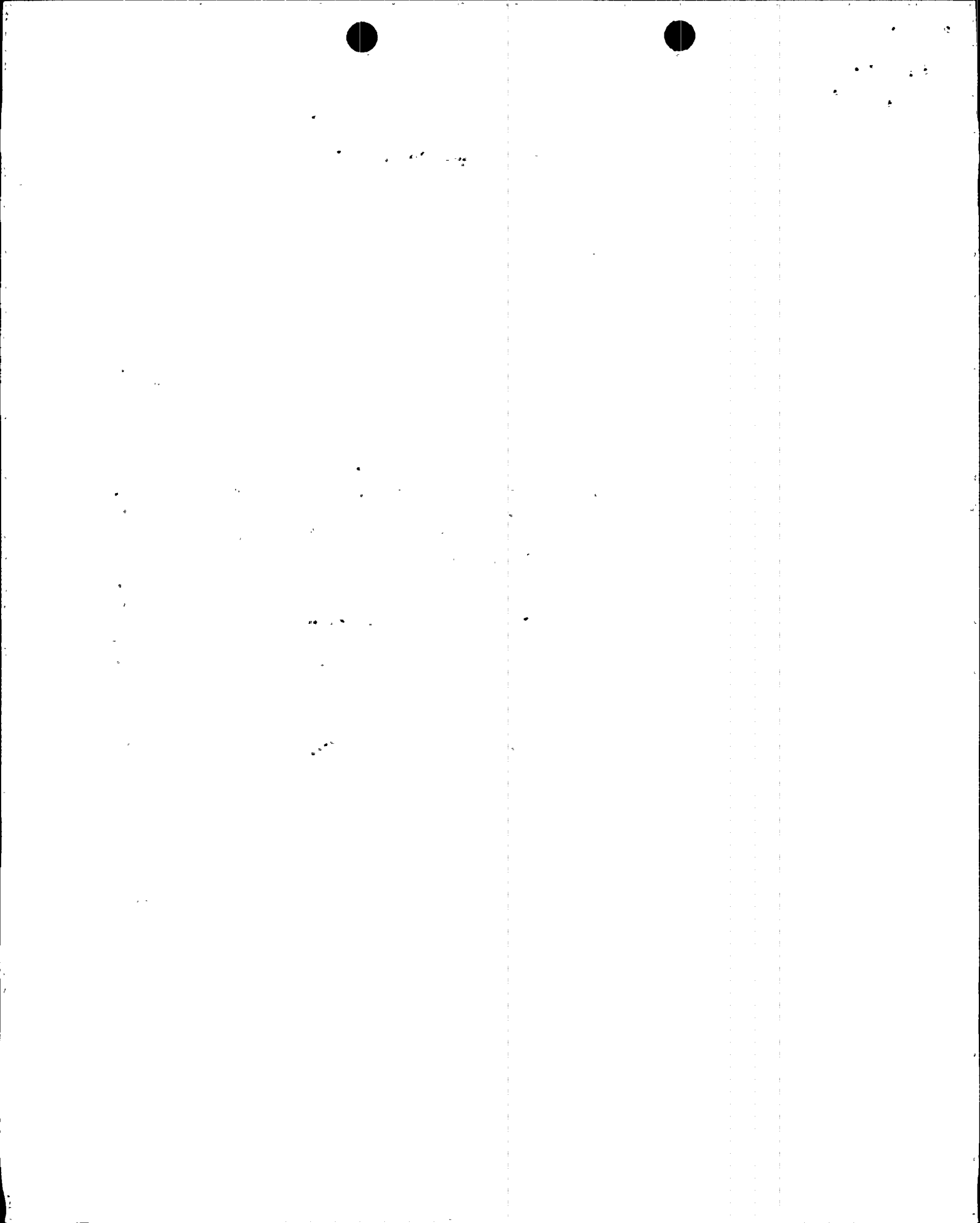
Isolation Devices

Please provide the following:

- (a) For the type of device used to accomplish electrical isolation, describe the specific testing performed to demonstrate that the device is acceptable for its application(s). This description should include elementary diagrams, when necessary, to indicate the test configuration and should describe how the maximum credible faults were applied to the devices.
- (b) Data to verify that the maximum credible faults applied during the test were the maximum voltage/current to which the device could be exposed, and define how the maximum voltage/current was determined.
- (c) Data to verify that the maximum credible fault was applied to the non-Class 1E side of the device in the transverse mode (between signal and return) and that other faults were considered (i.e., open and short circuits).
- (d) Define the pass/fail acceptance criteria for each type of device.

APS Response

Westinghouse relays, Catalog #AR440A, are to be utilized as the isolation device for the DSS Modification. This type of relay has been qualified and utilized as isolation devices in existing design applications at PVNGS. The Westinghouse #AR440A relay is an industrial type device. The relay contacts, which have a high current rating, are utilized in a low energy control circuit application; hence, the maximum credible fault issue is considered to be incredible for this application. No additional testing or analysis will be performed based on the design application of the



relays. The coil of the relay is wired in the Class 1E circuitry of the existing Supplementary Protection System (SPS) and the contacts, which are considered non-1E, supply open signals to the M-G set output load contactor control circuitry.

- (e) A commitment that the isolation devices comply with the environmental qualifications (10 CFR 50.49) and seismic qualifications that were the basis for plant licensing.

APS Response

The Westinghouse relays (isolation devices) to be utilized will comply with the environmental and seismic qualification design basis for PVNGS licensing.

- (f) A description of the measures taken to protect the safety systems from electrical interference (i.e., Electrostatic Coupling, EMI, Common Mode and Crosstalk) that may be generated by the ATWS circuits.

APS Response

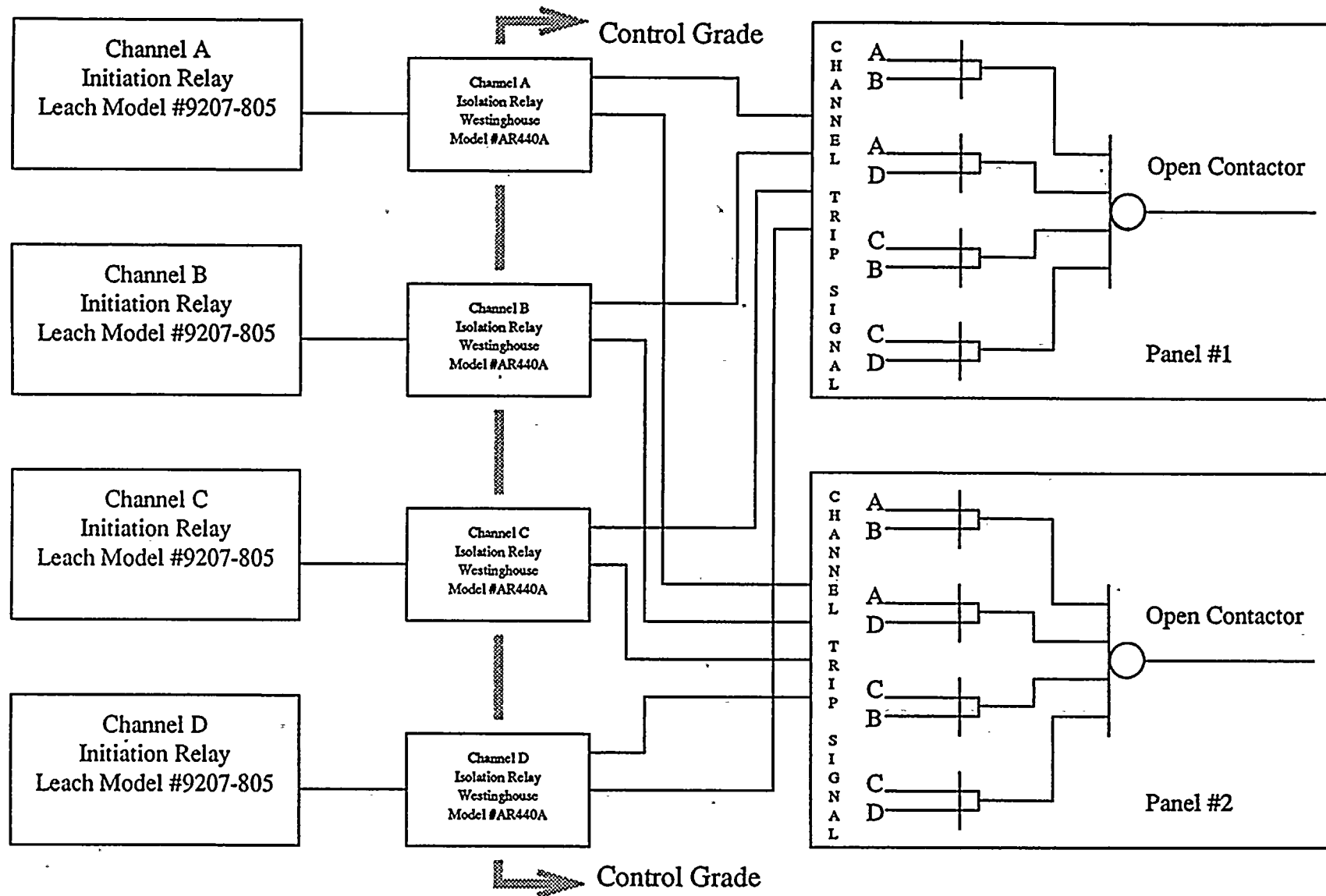
The isolation relays have been qualified and utilized as isolation devices in existing similar design applications at PVNGS. The relay design application is in accordance with IEEE Standard 384 and has proven itself by past operation as no electrical interference (Electrostatic Coupling, EMI, Common Mode and Crosstalk) has been experienced by these design applications.

- (g) Information to verify that the Class 1E isolator is powered from a Class 1E source.

APS Response

The isolation relays (Class 1E coil, non-1E contacts) for the M-G Set contactors actuation is powered from the same Class 1E source as its respective Supplementary Protection Logic Assembly panel. These panels are powered from the four Class 1E 120 VAC Vital Instrument buses (channels) E-PNA-D25, E-PNB-D26, E-PNC-D27 and E-PND-D28.

DIAGRAM A



SPLA Panels

SPLA Isolation Panels

M-G Set Control Panels 1 & 2

ATWS DSS MODIFICATION

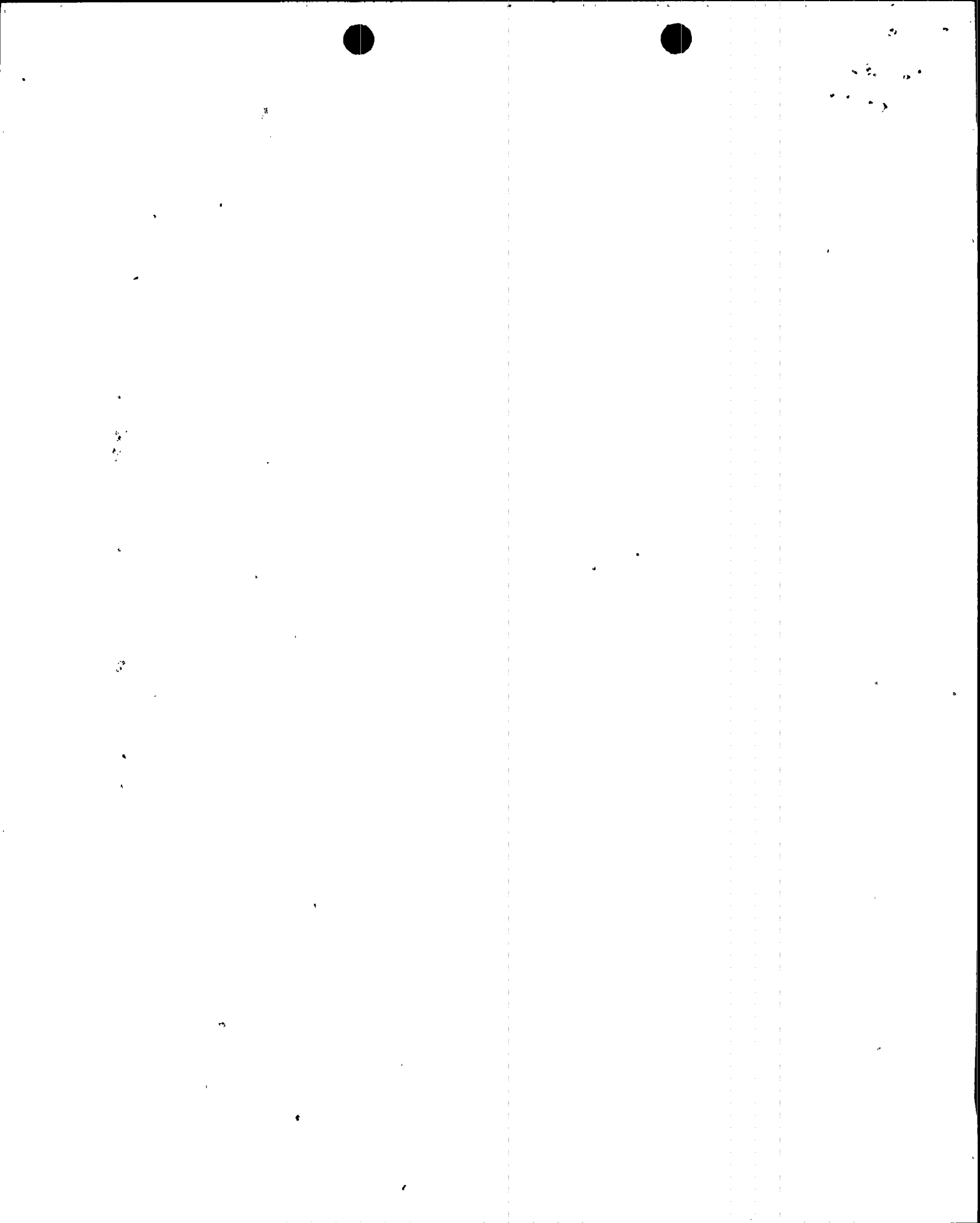


FIGURE 1: DIVERSITY OF THE EXISTING AUXILIARY FEEDWATER ACTUATION CIRCUITRY FOR PALO VERDE NUCLEAR GENERATING STATION UNITS 1, 2, & 3
(Modified to include power supplies and power sources)

